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Core-shell pigments based on microcalcite with phosphate and phosphonate/amine shells

Ziganshina M., Sorokov A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018, International Multidisciplinary Scientific Geoconference. All rights reserved. The use of corrosion inhibitors in the paint materials is an important task, since inhibitors often cannot be included individually in the paint formulation directly. In this case, corrosion inhibitor having a high affinity to the surface of a substrate and a plasticizing effect in relation to the film-forming base of the formed coating can have a negative impact on its adhesion and physical and mechanical properties. One of the ways to eliminate this disadvantage is the use of immobilized inhibitors, in particular those associated with the surface of high-dispersed cheap fillers. In this case, sorption, conversion, and other thin surface shells of inhibitor can be formed. While introducing such core-shell pigments into the composition of the paint material and, accordingly, into the coating, bound-to-surface inhibitor does not have the abovementioned negative effect on the properties of coating. When a moisture penetrates into the volume of a paint film, inhibitor is extracted from a shell under its hydrolytic effects, and it diffuses towards the surface of the substrate, where an inhibition action is going on. In this work, microcalcite was used as the core upon receiving core-shell pigments, while as inhibitors ester of phosphoric acid and aliphatic alcohol, as well as oxyethylidenediphosphonic acid and amine adducts (aniline, polyethylene polyamine, aliphatic amine C13) were used. The individual inhibitory properties of the listed compounds, the effect of the shell formation on a dispersibility of calcite in alkyd varnish for the preparation of filled paint and varnish materials, and barrier and anticorrosion properties of coatings formed on their basis were investigated.

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Keywords

Aminophosphonates, Calcite, Coatings, Core-shell particles, Corrosion protection, Modification, Phosphate, Primer

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